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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,640	02/13/2004	Takuya Sakaguchi	239216US2	5376
22850	7590	01/25/2006		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER KIKNADZE, IRAKLI	
			ART UNIT 2882	PAPER NUMBER

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/777,640

Applicant(s)

SAKAGUCHI ET AL.

Examiner

Irakli Kiknadze

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-4 and 10-23 is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 5-9 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/13/2004</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election with traverse of Group I in the reply filed on October 11, 2005 is acknowledged. The traversal is on the ground(s) that the claims of Groups I and II appear to be part of an overlapping search area and examination of the entire application would not place a serious burden on the Examiner. This is not found persuasive because the two groups require divergent searches as evidenced by their different classification. The search criteria used for the claims of group I cannot be used for the claims of group II since the claims of group II do not require scatter correction.

Accordingly the requirement is still deemed proper and is therefore made FINAL.

2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claims 5-9 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on October 11, 2005.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites the limitation "other X-ray tube" in line 6. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez Trotter et al. (US Patent 6,748,047) in view of Granfors et al. (US Patent Application Publication 2003/0223539 A1).

With respect to claim 1, Gonzalez Trotter teaches a method for obtaining an X-ray image for an X-ray diagnosis apparatus, the method comprising:

collecting image data (column 4, lines 2-12) including a scatter component using a plurality of X-ray detectors (16) (column 3, line 18) after at least one X-ray is irradiated from an X-ray tube (14) (column 3, line 17);

collecting scatter data (column 4, lines 18-20) using a plurality of X-ray detectors (18) after at least one X-ray is irradiated from the X-ray tube (column 4, lines 29-31);

obtaining at least one X-ray image by subtracting at least one of the scatter data from the image data including the scatter component (claim 5).

Gonzalez Trotter fails to teach collecting scatter data using a plurality of X-ray detectors at a speed higher than a collection time of the image data. It is known that scattering results in lowering resolution of the x-ray image. Granfors teaches a method of acquiring x-ray image data with lower resolution utilizing a higher frame rate than the frame rate available during high resolution imaging ([0025], lines 15-25). Furthermore, by reading out the scatter data at low resolution and at high speed would reduce the overall imaging time while reducing irradiating dose on the patient. It would have been obvious to one of ordinary skill in art at the time the invention was made to collect the low resolution data using a plurality of X-ray detectors at a speed higher than a collection time of the image data as suggested by Granfors in the method of Gonzalez Trotter, since such a modification would provide user with capabilities to obtain the scatter free images while reducing the overall imaging time and reducing irradiating dose on the patient.

***Allowable Subject Matter***

8. Claims 2-4 and 10-23 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 2, The prior art fails to teach or make obvious a method for obtaining an X-ray image using an X-ray diagnosis apparatus comprising: collecting,

substantially simultaneously, image data including a scatter component using a first and a second X-ray detectors; and obtaining X-ray images imaged using a first imaging system and a second imaging system by subtracting the scatter data collected by the first and second X-ray detectors from the image data including the scatter component collected by the first and second X-ray detectors, wherein a collection time of a scatter data is shorter than a collection time of the image data including the scatter component as claimed in combination with all elements of claim 2.

With respect to claim 3, The prior art fails to teach or make obvious a method for obtaining an X-ray image using an X-ray diagnosis apparatus, the method comprising: collecting, substantially simultaneously, image data including a scatter component using a first and a second X-ray detectors after at least one X-ray is irradiated from a second X-ray tube; and obtaining X-ray images imaged using a first imaging system and a second imaging system by subtracting the scatter data collected by the first and second X-ray detectors from the image data including the scatter component collected by the first and second X-ray detectors, wherein a collection time of the scatter data is shorter than a collection time of the image data including the scatter component in combination with all elements of claim 3.

With respect to claim 4, the prior art fails to teach or make obvious a method a method for obtaining an X-ray image using an X-ray diagnosis apparatus, the method comprising: subsequently collecting, substantially simultaneously, image data including a scatter component using a first and a second X-ray detectors; subtracting a second scatter data from the first scatter data, thereby obtaining subtracted scatter data;

obtaining an X-ray image by subtracting the subtracted scatter data from the image data including the scatter component collected by the first X-ray detector; and obtaining an X-ray image by subtracting the scatter data collected by the second X-ray detector from the image data including the scatter component collected by the second X-ray detector, wherein a collection type of the scatter data is shorter than a collection time of the image data including the scatter component in combination with all elements of claim 4.

With respect to claims 10-18, the prior art fails to teach or make obvious a method for obtaining X-ray image by an X-ray diagnosis apparatus, the method comprising: collecting third image data at a speed lower than a collecting speed of a second image data using a first X-ray detector based on the X-rays irradiated from a first and second X-ray tubes; collecting fourth image data at a speed lower than a collecting speed of the first image data using the second X-ray detector, substantially simultaneously with the collecting the third image data, based on the X-rays irradiated from the first and second X-ray tubes; removing a scatter component included in the third image data using the second image data; and removing a scatter component included in the fourth image data using the first image data in combination with all elements of claim 10. Claims 11-18 are allowable by virtue of their dependence.

With respect to claim 19, the prior art fails to teach or make obvious a method for obtaining an X-ray image using an X-ray diagnosis apparatus, the method comprising: collecting forth image data using a second X-ray detector, substantially simultaneously to collecting third image data, based on the X-rays irradiated from a first and second X-ray tubes; removing a scatter component included in the third image data using the

second image data; and removing a scatter component included in the fourth image data using first image data in combination with all elements of claim 19.

With respect to claim 20, the prior art fails to teach or make obvious a method for obtaining an X-ray image using an X-ray diagnosis apparatus, the method comprising: collecting second image data using the second X-ray detector based on the X-rays irradiated from the first and second X-ray tubes at a lower speed than a collecting speed of the first image data; and removing a scatter component included in the second image data using the first image data in combination with all elements of claim 20.

With respect to claim 21, the prior art fails to teach or make obvious an X-ray diagnosis apparatus, comprising: a controller configured to control the second X-ray detector to collect first image data based on at least one X-ray irradiated from a first X-ray tube, a first X-ray detector to collect second image data based on at least one X-ray irradiated from a second X-ray tube, the first X-ray detector to collect third image data based on the X-rays irradiated from the first and second X-ray tubes at a lower speed than a collecting speed of the second image data, the second X-ray detector to collect fourth image data, substantially simultaneously to collecting the third image data, based on the X-rays irradiated from the first and second X-ray tubes at a lower speed than a collecting speed of the first image data; and an image processor configured to remove a scatter component included in the third image data using the second image data and to remove a scatter component included in the fourth image data using the first image data in combination with all elements of claim 21.



With respect to claim 22, the prior art fails to teach or make obvious an X-ray diagnosis apparatus, comprising: a controller configured to control a second X-ray detector to collect first image data based on at least one X-ray irradiated from a first X-ray tube, a first X-ray detector to collect second image data based on at least one X-ray irradiated from the first X-ray tube, the first X-ray detector to collect third image data based on the X-rays irradiated from the first and a second X-ray tubes, the second X-ray detector to collect fourth image data, substantially simultaneously to collecting the third image data, based on the X-rays irradiated from the first and second X-ray tubes; and an image processor configured to remove a scatter component included in the third image data by using the second image data and to remove a scatter component included in the fourth image data using the first image data in combination with all elements of claim 22.

With respect to claim 23, the prior art fails to teach or make obvious an X-ray diagnosis apparatus, comprising: a controller configured to control a first X-ray tube to irradiate at least one X-ray, a second X-ray detector to collect first image data based on the at least one X-ray irradiated from the first X-ray tube, a second X-ray tube to irradiate at least one X-ray, and the second X-ray detector to collect second image data based on the X-rays irradiated from the first and second X-ray tubes at a lower speed than a collecting speed of the first image data; and an image processor configured to remove a scatter component included in the second image data using the first image data in combination with all elements of claim 23.

**Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Busse et al. (US Patent Application Publication 2003/0146389 A1) and Ozaki (US Patent 6,876,719 B2) the methods and apparatus for teach X-ray scatter correction based on projection and scatter correction data.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze  
January 20, 2006

IK

  
EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER